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Pesticide Fact Sheet Number 56: Cyhexatin

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This document contains up-to-date chemical information, including a summary of the Agency's regulatory position and rationale, on a specific pesticide or group of pesticides. A Fact Sheet is issued after one of the following actions has occurred.

1. Issuance or reissuance of a registration standard,
2. Issuance of each special review document,
3. Registration of a significantly changed use pattern,
4. Registration of a new chemical, or
5. An immediate need for information to resolve controversial issues relating to a specific chemical or use pattern.

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b. Identifiers/Open-Ended Terms

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Pesticide Fact Sheet

Name of Chemical: CYHEXATIN
Reason for Issuance:
Date Issued: June 30, 1985
Fact Sheet Number: 56

1. DESCRIPTION OF CHEMICAL

- Generic Name: Tricyclohexylhydroxystannane
- Common Name: Cyhexatin
- Trade Name: Plictran®, Acarstin® and Dowco® 213
- EPA Shaughnessy Code: 101601
- Chemical Abstract Service (CAS) Number: 13121-70-5
- Year of Initial Registration: 1972
- Pesticide Type: Miticide
- Chemical Family: Organotins
- U.S. Producer: Dow Chemical Company

2. USE PATTERNS AND FORMULATIONS

- Application sites: apples, pears, citrus, peaches, plums, nectarines, strawberries, almonds, walnuts, hops, and ornamental plants (including greenhouse grown)
- Types and methods of applications: aerial and ground application as a spray
- Application rates: 0.5 lb active ingredient (ai)/A to 2.0 lbs ai/A
- Usual Carriers: wettable powders

3. SCIENCE FINDINGS

Chemical Characteristics

- Technical cyhexatin is a white, crystalline powder, nearly odorless that has no true melting point, degrades to bistricyclohexyltin oxide at 121 to 131° C and decomposes at 228° C.
- It is soluble in some organic solvents and is very insoluble in water.
- Vapor pressure is negligible at 25° C, it is stable in aqueous suspensions in neutral and alkaline pH, reacts ionically in the presence of a strong acid to form salts, converts to dicyclohexyltin oxide and further to cyclohexylstannoic acid by exposure to ultraviolet radiation.

Toxicology Characteristics

- Acute oral: 196 mg/kg (rat), Toxicity Category II.
- Acute dermal: Data gap.
- Primary Eye Irritation: Causes eye irritation--corneal and iris irritation (rabbit), Toxicity Category II.
- Acute Inhalation: 6.35 mg/l (rat), Toxicity Category III.
- Primary Skin Irritation: Nonirritant, Toxicity Category IV.
- Skin Sensitization: Not a sensitizer.
- Major Routes of Exposure: Human exposure from cyhexatin applications is greatest from mixing and loading of pesticide formulation and applying it. Exposure can be reduced by the use of goggles or face shield and gloves and other protective clothing.
- Neurotoxicity: Cyhexatin is not expected to be a delayed neurotoxin because it is neither an organophosphate nor an analog of a neurotoxic compound.
- Oncogenicity: Data gap. Study submitted does not meet Agency standards.
- Metabolism: Available data suggest that cyhexatin is not readily absorbed in tissues and is excreted in the feces. The minor amount that is not excreted is metabolized to an organotin form and is accumulated in the liver and kidney with lesser levels found in the brain, heart, adrenal, and muscle.
- Teratology: Adequate data are unavailable. Data gap.
- Reproduction: Adequate data are unavailable. Data gap.
- Mutagenicity: Adequate data are unavailable. Data gap.

Physiological and Biochemical Characteristics

- Mechanism of pesticidal action: It is suspected that cyhexatin inhibits adenosine triphosphate (ATP) enzymes.
- Metabolism and persistance in plants and animals: Available data suggest that plant degradates of cyhexatin are translocated following root exposure, however these data are insufficient to adequately characterize plant metabolism. Known animal metabolism is summarized above.

Environmental Characteristics

- Available data are insufficient to fully assess the environmental fate of cyhexatin. Data gaps exist for all required studies.

- The available data do suggest that cyhexatin can leach slowly in certain soils. Data are required to assess cyhexatin's environmental fate and ability to leach through soils.

Ecological Characteristics

- Avian acute oral (LD_{50}) toxicity: approximately 250 mg to 400 mg technical cyhexatin/kg body weight for quail (moderately toxic).
- Avian dietary (LC_{50}) toxicity: 195 ppm for bobwhite quail (highly toxic).
- Freshwater fish acute (LC_{50}) toxicity: cold water species (rainbow trout)--6 ppb for technical; warm water species (bluegill)--4 ppb for technical.
- Aquatic freshwater invertebrates toxicity: Daphnia--0.2 ug/l.
- Additional data are required to fully characterize the ecological effects of cyhexatin.

Required Unique Labeling Summary

All manufacturing-use and end-use cyhexatin products must bear appropriate labeling as specified in 40 CFR 162.10. In addition to the above, the following information must appear on the labeling:

- Manufacturing-use products must state that they are intended for formulation into other manufacturing-use products or end-use products for uses which are accepted by the Agency.
- Current labels must be revised to reduce the recommended spray gallonage and active ingredient per acre for pears, peaches, plums (prunes), and nectarines.
- Labels must be revised to incorporate the use of additional protective clothing such as mask or respirators and chemically resistant gloves.

Tolerance Assessment

- The Agency is unable to complete a full tolerance assessment for the established tolerances because of certain residue chemistry and significant toxicology data gaps.
- Established tolerances are published in 40 CFR 180.144 and they are:

Commodity	Parts Per Million
Almonds	0.5
Almonds, hulls	60
Apples	2
Cattle, fat	0.2
Cattle, kidney	0.5
Cattle, liver	0.5
Cattle, meat byproducts (mbyp)	0.2
Cattle, meat	0.2
Citrus fruits	2
Goats, fat	0.2
Goats, kidney	0.5
Goats, liver	0.5
Goats, mbyp	0.2
Goats, meat	0.2
Hogs, fat	0.2
Hogs, liver	0.5
Hogs, mbyp	0.2
Hogs, meat	0.2
Hops	30
Horses, fat	0.2
Horses, kidney	0.5
Horses, liver	0.5
Horses, mbyp	0.2
Horses, meat	0.2
Macadamia nuts	0.5
Milk, fat	0.05
Nectarines	4
Peaches	4
Pears	2
Plums (fresh prunes)	1
Sheep, fat	0.2
Sheep, kidney	0.5
Sheep, liver	0.5
Sheep, mbyp	0.2
Sheep, meat	0.2
Strawberries	3
Walnuts	0.5

- The data for cyhexatin residues in or on the following agricultural commodities are adequate to support the residue data requirements: hops, macadamia nuts, and strawberries.
- Additional residue data are required for the following commodities: peaches, plums, nectarines, apples, pears, almonds, almond hulls, walnuts, citrus fruits, dried hops and meat, milk, poultry, and eggs.
- Based on the established tolerances the theoretical maximum residue contribution (TMRC) for cyhexatin residues in the human diet is 0.33 mg/day (for a 60 kg person with a 1.5 kg

diet). However, this was based on an acceptable daily intake (ADI) which has been invalidated due to the lack of a sufficient chronic toxicology data base.
- Compatability of U.S. tolerances with Codex Maximum Residue Limits will be assessed when data have been submitted and evaluated.

4. SUMMARY OF REGULATORY POSITION AND RATIONALE

- The Agency has determined that it should continue to allow the registration of cyhexatin. None of the criteria for unreasonable adverse effects listed in the regulations (§162.11(a)) have been met or exceeded. However, because of gaps in the data base a full risk assessment cannot be completed.
- Also, a full tolerance reassessment cannot be completed because of major residue chemistry and toxicology data gaps. Until these gaps are filled cyhexatin will not be registered for significant new uses.
- Available data are insufficient to fully assess the environmental fate of and the ecological effects from cyhexatin. Data are required to determine if cyhexatin will contaminate ground water.

5. SUMMARY OF MAJOR DATA GAPS

- Additional crop residue studies on various commodities and plant and animal metabolism studies are required to support existing tolerances. The full compliment of chronic toxicology requirements are data gaps: chronic feeding, oncogenicity, reproduction, and teratology and mutagenicity.
- The full compliment of environmental fate data requirements are data gaps. Studies on degradation (hydrolysis and photolysis), soil metabolism, mobility, dissipation, and accumulation are needed to fully characterize cyhexatin's environmental fate.
- Additional data are required on avian toxicology (acute and subacute oral and reproduction) and freshwater and marine organism acute toxicology.
- Other data gaps are product chemistry of technical cyhexatin, storage stability of residues, and acute and subchronic dermal toxicology.

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